In re Patent Application of:
BERGERON ET AL.
Serial No. **10/700,193**
Filed: **11/03/2003**

REMARKS

Claims 1-15 are pending in this application and have been rejected.

Claims 1-3, 5-7 and 12-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Scobey et al. US 6,320,996.

Claims 1, 8, and 14 have been amended.

Claim 13 has been cancelled.

New claim 16, dependent upon claim 1, has been added.

The Examiner has stated that Scobey et al. (US 6,320,996) show all of the limitations disclosed in claim 1.

Applicants have amended claim 1 to more clearly define the invention and to further distinguish the claims from Scobey et al.

A primary difference between the instant invention and that of Scobey et al., is that the instant invention defined in claim 1 requires a broadband reflector to be adjacent to the multi-cavity filter and to be so disposed as to be between planes coincident with a first input end face of the multi-cavity filter. Furthermore claim 1 has been amended in a manner so as to limit the broadband reflector as to being located between the layers of the multicavity filter.

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In the Applicants' specification the following text is found, which discloses the Scobey prior art patent and its limitations.

[2] "Another US patent to an invention essentially the same as that of Liou, is disclosed in U.S. patent number 6,320,996 with a provisional priority date of December 31, 1998, and is now assigned to JDS Uniphase.

[3] Ideally, a hitless filter should have negligible or "no" loss incurred in the express channels when a single channel is being dropped or added. Notwithstanding, data transmission errors may result in the example using a mirror 120 as shown in Fig. 1 of US patent 6,292,299. The potential problem occurs when the beam and/or filter are moved relatively wherein the beam makes a transition from the un-mirrored portion 110 to the mirrored portion 120 such that different portions of the same beam impinge upon the two portions 110 and 120. This will occur when the optical beam moves between points 1 and 2, or 3 and 4 due to a phase discontinuity between the mirrored and un-mirrored portions.

[4] One skilled in the art could suggest placing the mirror at the opposite side of the filter with respect to the incident optical beam signal. This would eliminate the phase discontinuity described in the previous paragraph, for all express channels, in this instance, those reflected.

> [5] In that case however, the central wavelength corresponding to any given position of the optical beam on the mirrored area will suffer temporal delay when compared to all other channels. This delay will correspond to the light traveling back and forth across the whole filter for that central wavelength channel and, this would result in coupling loss for that channel. The coupling loss, or "hit", will travel from channel to channel as the beam is translated from point 2 to point 3 in Fig.1."

Shown below is a direct pictorial comparison between the instant invention and that of Scobey et al., which more clearly illustrates the difference between the two.

Rather than using Fig. 8 of Scobey et al., Applicants have, for purposes of illustration, used Scobey et al.'s Fig. 10, which appears to be more similar to Applicants' invention than Scobey et al.'s Fig 8, notwithstanding the same difference exists between the Scobey's et al. Fig. 8 and Fig. 10 and the claimed invention.

Referring to the two diagrams, shown below, Fig. 10 of Scobey et al. illustrates a reflector 170 located under the filter 168. (The same applies in Fig. 8 of Scobey et al.) In contrast, Applicants' reflector 170' is disposed "within" the multicavity filter rather than "under" it.

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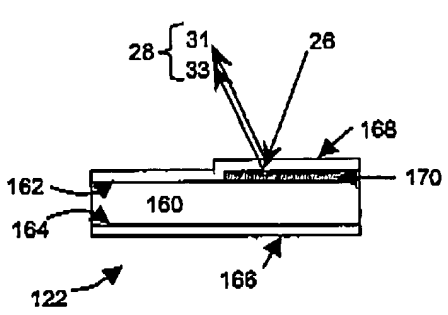
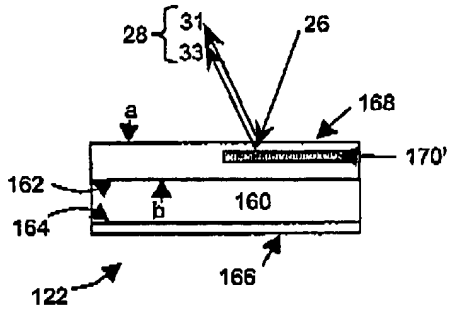


Scobey's figure 10



The Instant invention

Instead of a reflective coating 170, the instant invention has a layer* 170' inserted inside the structure of the multi-cavity wavelength selective filter 168 (between "top" and "bottom" ends *a* and *b* of 168).
170' is inserted in a location that is sufficiently far from 'top' a of the multi-cavity filter structure as to ensure a proper phase match when first beam 26 is crossing between reflective and transmissive sections. ['Location' in terms of which cavity of the multi-cavity is 'decoupled'.]
At the same time, 170 is inserted in a location that is sufficiently close to "top" a to insure negligible time delay between reflected beams 31 and 33.
In Scobey's teaching his reflected beam 33 passes through all cavities of the multi-cavity filter, resulting in a significant time delay with beam 31.
* = "A single layer with thickness other than a half wave, or integer multiple of a half wave", or any other alteration to one cavity of the multi-cavity filter that will decouple that cavity.

Claim 1 has been amended to reflect this critical difference between the structure of Scobey et al. and the structure of Applicants' invention.

Claims 8 and 14 have also been amended to more clearly define the broadband reflector as being disposed between end faces of the filter, wherein the end faces are defined to be faces upon which light is launched into and out of the filter.

It is respectfully submitted that the amendatory language inserted into claims 8 and 14 delineates the fact that the broadband reflector is between the two end faces of the filter, in contrast to the invention of Scobey, wherein the

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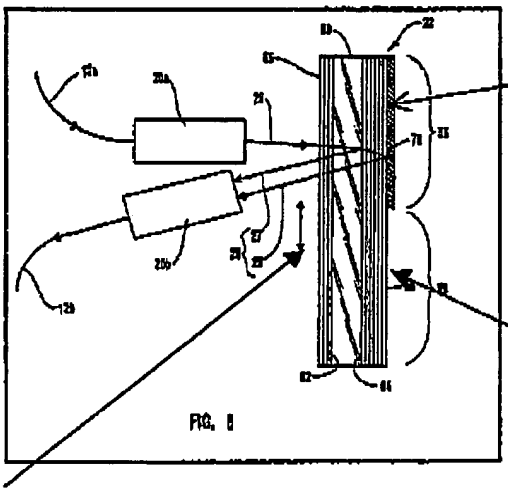
reflector is not between the two end faces, but is shown as being outside and against one of the end faces.

In Fig. 8 and the accompanying description within the Scobey et al. '996 patent, there is no suggestion of placing the reflective coating anywhere but outside of the wavelength selective filter end faces, rather than between planes coincident with these end faces.

The amended claims in the instant application are now believed to clearly distinguish over Scobey et al.



The filter is shown in Scobey to be outside of the end faces rather than between planes coincident with the filter input end and output end face.

Output end face for passing therethrough one or more channels

Input end face for receiving channels

With regard to claim 2, the Examiner has stated that Scobey et al. show in Figure 8 that the broadband filter (68)

is spaced from the planes coincident with the first and second filter.

While this may be correct, Scobey et al.'s Figure 8 does not show the filter 68 spaced from and between input and output end faces of the filter (or light receiving and light transmitting end faces of the filter). Furthermore, Scobey et al.'s filter 68 is not within and between the multicavity filter, as now defined in the claims.

With regard to claim 7, it is not clear to Applicants how Scobey et al.'s reflector could be distal from the planes coincident with the top and bottom ends, when, in fact, the Scobey et al. filter is touching the plane coincident with the bottom end.

As noted above, claim 8 has been amended to more clearly distinguish from Scobey et al. and to more clearly define Applicants' invention. It is believed that the language used in claim 8 more precisely defines the location of these end faces with respect to the broadband optical reflector.

Claim 8 now clearly defines the filter as including a plurality of optical cavities that are between opposite end faces of the filter, and confines the broadband reflector to be within or between the optical cavities. The advantages of this arrangement are discussed in detail above, and this embodiment is not shown or suggested in any of the prior art which, as noted above, places the reflector outside of the multicavity filter.

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With respect to claim 9, the Examiner has stated that it would have been obvious to one skilled in the art to modify the reflector of Scobey et al. with the values as claimed. Applicants respectfully disagree. Claim 9 imports the limitations of claim 8 from which it depends and, within the context of having the reflector between or within the cavities (not disclosed by Scobey et al.), the incorporated features of claim 8 are particularly relevant. Simple experimentation with Scobey et al.'s design would not lead to the invention defined in claim 9. Applicants are claiming an entirely different structure, which solves a problem not addressed or suggested by Scobey.

With regard to claim 15, although Scobey et al. disclose that their reflector may comprise several layers, there is simply no disclosure defining a structure wherein the reflector is buried within the filter itself, having a planar filter layer covering both the cavities and the reflector.

Thus, Applicants are of the opinion that neither the fabrication method of claim 15, nor a structure resulting from the method of claim 15, is disclosed by Scobey et al.

Claims 4 and 8-11 are rejected under U.S.C. 103 (a) as being unpatentable over Scobey et al.

With respect to claims 4-8, the Examiner states that Scobey et al. show a filter in Fig. 8 having a first transmissive region and a second reflective region, the regions disposed between first and second opposite ends of the filter. It is further said that Scobey et al. do not disclose

the broadband optical reflector as being a layer having a thickness other than a half wave or integer multiple half wave. It is then suggested by the Examiner that having a thickness other than a half wave or multiple thereof would be obvious to one having ordinary skill in the art by modifying Scobey et al.'s reflector layer for the purpose of obtaining the highly efficient transmission of an optical signal.

Applicants respectfully traverse this statement. Firstly, Scobey et al. do not teach or suggest the criticality of the placement of the reflector layer, whose thickness is yet a further feature related to its location. Applicants have attempted to overcome serious limitations with the prior art by selecting the location and thickness of the reflector that lessen phase delay and, at the same time, lessen time delay between light reflected from the filter and the reflector. There is no suggestion of this feature, which is believed to be clearly recited in newly added claim 16, in the cited prior art.

Furthermore, claims 4 and 8-11 now include the specific limitation that the reflector is disposed within the multicavity filter layers itself, or within or between one of the optical cavities, which limitations are not suggested by the prior art.

Finally, as noted above, newly added claim 16, dependent upon amended claim 1, further delimits that claim, by specifying that the position of the reflector is selected to lessen a difference in phase in portions of a beam spanning functionally different regions of the multicavity filter,

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while lessening a time delay between wavelengths reflected from the broadband reflector and from the filter, as disclosed in paragraphs [51]-[63] of the specification. This feature is neither disclosed nor suggested by Scobey et al., discussed above, and cited against claim 1.

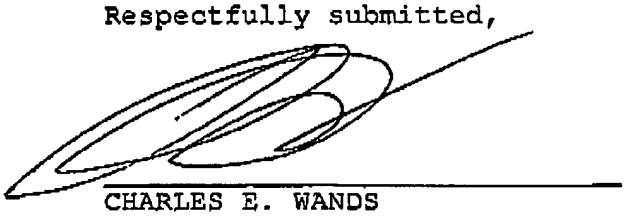
In view of the foregoing remarks and amendments to the claims, it is respectfully submitted that the instant application is now in condition for allowance.

Early and favorable reconsideration of the Examiner's objections would be appreciated.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 50-1465 and please credit any excess fees to such deposit account.

Respectfully submitted,



CHARLES E. WANDS
Reg. No. 25,649

Telephone: (321) 725-4760

CUSTOMER NO. 27975